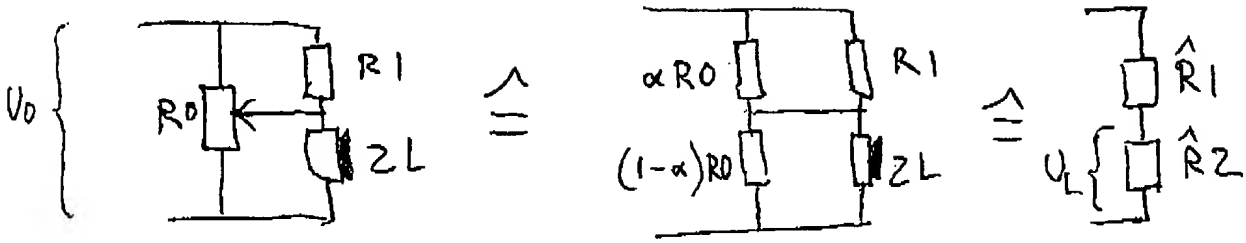
Appendix A I



SCHOLZ

α represents a value from 0 - 1
(attenuation according to position of switch)

$$\hat{R}1 = \frac{\alpha R0 \cdot R1}{\alpha R0 + R1}, \quad \hat{R}2 = \frac{(1-\alpha) R0 \cdot ZL}{(1-\alpha) R0 + ZL}$$

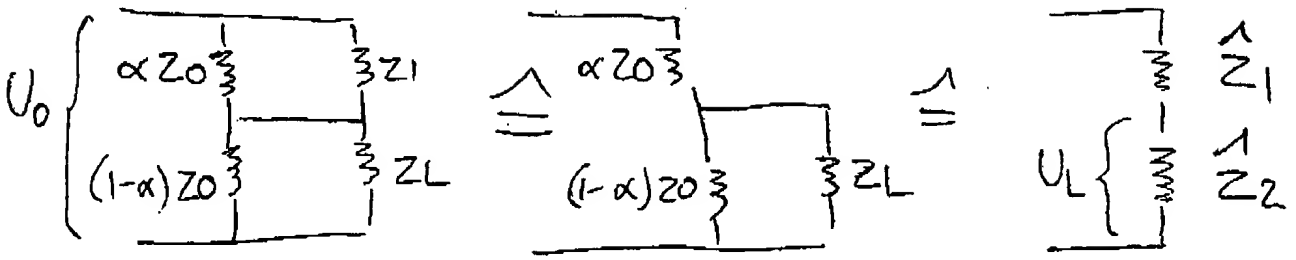
$$U_L = \frac{\hat{R}2}{\hat{R}_1 + \hat{R}_2} U_0 = \frac{1}{1 + \frac{\hat{R}1}{\hat{R}2}} U_0 = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R1}{ZL} \cdot \frac{(1-\alpha) R0 + ZL}{\alpha R0 + R1}}$$

It assumed that $ZL < R0$ (SCHOLZ requires $R1 + ZL \leq R0$)

$$U_L = \frac{1}{1 + \left(\frac{\alpha}{1-\alpha}\right) \frac{R1}{ZL} \cdot \frac{(1-\alpha) R0}{\alpha R0 + R1}} U_0 \approx \frac{1}{1 + \alpha \frac{R0}{ZL}} U_0$$

Because ZL is frequency-dependent ($R_2 - i\omega L$) the voltage U_L is not in constant relation to U_0

Appendix A II



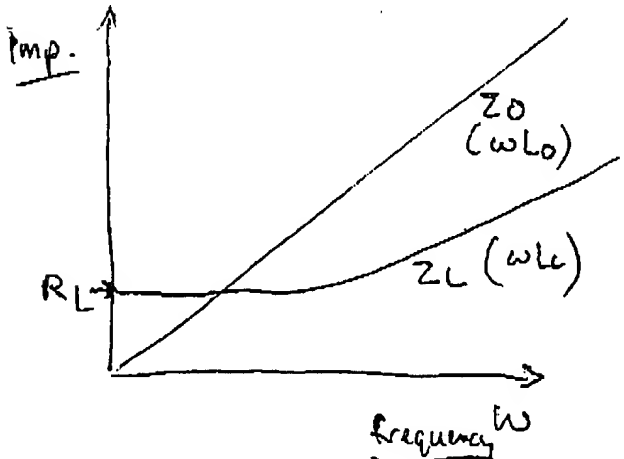
$$U_L = \frac{1}{1+\frac{\hat{Z}_1}{\hat{Z}_2}} = \frac{1}{1+\left(\frac{\alpha}{1-\alpha}\right)\cdot\frac{(1-\alpha)Z_0+Z_L}{Z_L}}\,U_0$$

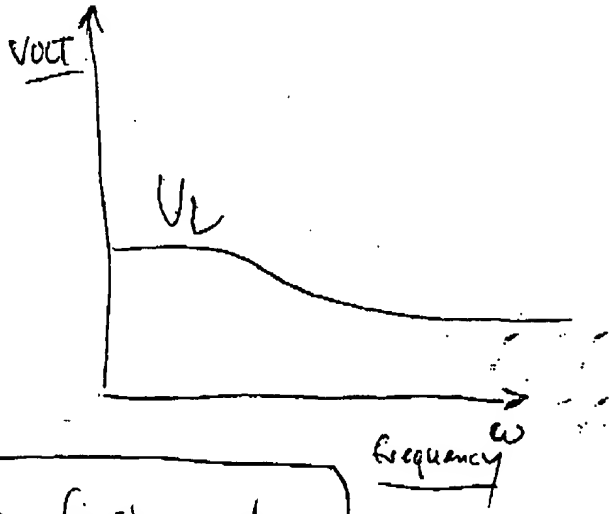
For low frequencies ($Z_0 \ll Z_L$)

$$U_L \approx \frac{1}{1+\left(\frac{\alpha}{1-\alpha}\right)}\,U_0$$

For high frequencies ($Z_L \ll Z_0 \approx -i\omega L_0$)

$$U_L \approx \frac{1}{1+\left(\frac{\alpha}{1-\alpha}\right)\cdot\frac{(1-\alpha)L_0}{Z_L}}$$

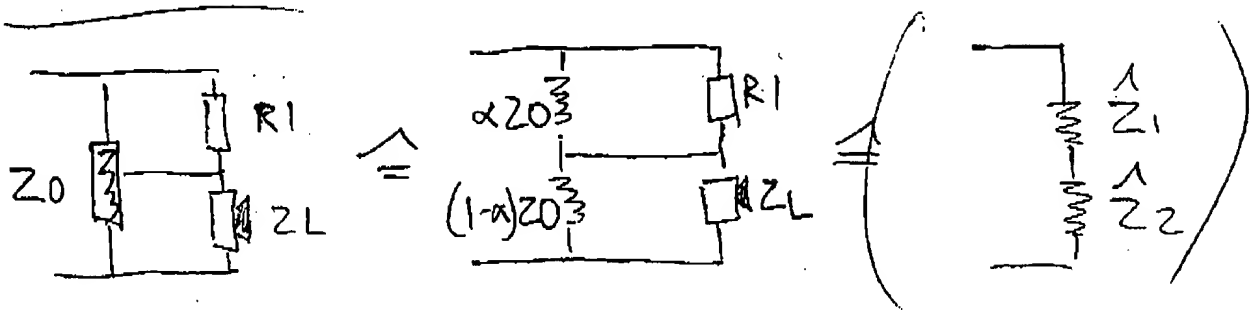




Frequency-dependent in first order

Appendix A

III



see I

$$U_L = \frac{1}{1+\left(\frac{\alpha}{1-\alpha}\right)\frac{R_1}{Z_L}\cdot\frac{(1-\alpha)Z_0+Z_L}{\alpha Z_0+R_1}}\,U_0$$

Z_0 is in approximate proportion to $Z_L \Rightarrow Z_0 = \beta Z_L$

R_1 is Larger than $Z_0 \Rightarrow \alpha Z_0 + R_1 \approx R_1$

$$U_L \approx \frac{1}{1+\left(\frac{\alpha}{1-\alpha}\right)\cdot\left[1+\beta(1-\alpha)\right]}\,U_0$$

no frequency-dependence in first order !